DIRECT TESTIMONY AND EXHIBIT OF

SAMUEL WYROBECK

ON BEHALF OF

THE SOUTH CAROLINA OFFICE OF REGULATORY STAFF

DOCKET NO. 2019-227-E

IN RE: SOUTH CAROLINA ENERGY FREEDOM ACT (HOUSE BILL 3659)

PROCEEDING RELATED TO S.C. CODE ANN. SECTION 58-37-40

INTEGRATED RESOURCE PLANS FOR LOCKHART POWER COMPANY

Q. STATE YOUR NAME, BUSINESS ADDRESS AND OCCUPATION.

A. My name is Samuel Wyrobeck and I am a Consultant of J. Kennedy and Associates, Inc. ("Kennedy and Associates"). My business address is 570 Colonial Park Drive, Suite 305, Roswell, Georgia, 30075.

Q. DESCRIBE YOUR EDUCATIONAL BACKGROUND AND PROFESSIONAL EXPERIENCE.

A. I received a Bachelor of Science degree in Biochemistry from Florida State University, and a Bachelor of Arts degree in Applied and Computational Mathematics from the University of South Florida. I have almost two (2) years of experience in the electric utility industry, having conducted studies concerning Integrated Resource Planning ("IRP"), wind and solar resource acquisitions, net metering, and a nuclear resource acquisition. The studies I have performed have relied on production cost models, capital revenue requirement analyses, resource optimization models, and economic analysis models. A summary of my education and experience is included in Exhibit SW-1.

Q. ON WHOSE BEHALF DO YOU PROVIDE THIS TESTIMONY?

A. I am providing this testimony on behalf of the South Carolina Office of Regulatory Staff ("ORS").

Q. HAVE YOU PREVIOUSLY TESTIFIED BEFORE THE PUBLIC SERVICE COMMISSION OF SOUTH CAROLINA ("COMMISSION")?

A. I have not previously testified before the Commission. This is my first instance of testifying before a regulatory commission. I have experience in the use of production cost models such as Strategist, GRID, and Cumulus to analyze utilities. I have also provided analysis in multiple IRP proceedings for utilities including Georgia Power, Kentucky Power, Xcel Energy, and Dominion Energy South Carolina.

Q. DESCRIBE THE PURPOSE OF YOUR TESTIMONY.

A. The purpose of my testimony is to describe my role in Kennedy and Associates' review of Lockhart Power Company's ("LPC" or "Company") 2020 Integrated Resource Plan ("LPC IRP"), including the assessment of the Company's compliance with the statutory requirements of S.C. Code Ann. Section 58-37-40 ("Section 40"), as amended by the South Carolina Energy Freedom Act ("Act 62").

I worked closely with the ORS team, including Mr. Anthony Sandonato and others, and my colleague, Mr. Hayet, and other consultants at Kennedy and Associates. We prepared a report entitled, "Review of Lockhart Power Company's 2020 Integrated Resource Plan" (the "Report"), which includes our findings, conclusions, and recommendations. A copy of the Report is attached to ORS witness Anthony Sandonato's direct testimony as Exhibit AMS-1. Mr. Hayet also filed direct testimony in this proceeding and discusses his responsibilities in his direct testimony.

Q. DESCRIBE THE SCOPE OF KENNEDY AND ASSOCIATES' REVIEW OF LPC'S IRP.

A. Kennedy and Associates performed a comprehensive review of the Company's IRP filing, and evaluated whether LPC complied with the requirements of Section 40. As part of the review, Kennedy and Associates investigated the historical context of the IRP process in South Carolina, including the Act 62 requirements, prior Company IRP filings, as well as other regulatory filings, and Commission precedents. Kennedy and Associates reviewed all of the significant features of LPC's IRP and supporting documentation, including information about generation resources, peak and energy forecasts, and LPC's resource plan.

Q. WHAT WERE YOUR PRIMARY RESPONSIBILITIES WITH REGARD TO THE REPORT?

A. I was responsible for developing portions of the section of the report entitled "Evaluation of LPC's IRP." The sub-sections I was responsible for are titled "Sensitivity to Fuel Price Forecasts and Environmental Regulations" and "Existing System Resources and Resource Planning."

I would like to note that the Report contains a set of recommendations for issues the ORS believes should be addressed now within the context of this IRP proceeding (designated with an "N"), and a set of recommendations for issues that could be addressed over a longer term (designated with an "L" in the report), such as by the next IRP update in 2021, but no later than the next comprehensive IRP in 2023.

Q. PLEASE SUMMARIZE THE CONCLUSIONS OF YOUR ANALYSIS WITH REGARD TO SENSITIVITY TO FUEL PRICE FORECASTS AND ENVIRONMENTAL REGULATIONS.

A. With regard to sensitivity to fuel price forecasts, the Company did not develop any fuel price forecasts or evaluate any fuel price sensitivity cases to determine the risk associated with a range of fuel price outcomes (low, medium, and high). Likewise, the Company did not evaluate any potential environmental regulations, such as potential CO2 legislation in its IRP. Both of these are required elements of Section 40(B)(1)(e) of the IRP Statute. The Company asserts that in its case, there was no need to provide this information, as it relies on Duke Energy Carolinas, LLC ("DEC") for most of its energy requirements and DEC is responsible for evaluating fuel price risks in its IRP.[1] I disagree and believe the Company has an obligation to evaluate fuel price forecasts and environmental regulations pursuant to the IRP statute. In LPC's case, it would be reasonable for it to evaluate the risks of these sensitivities on its DEC power purchase costs, and the Company may have an approach for forecasting these costs that it uses for other purposes, such as for financial forecasting and for making resource acquisition decisions. These issues are discussed in greater detail in the Report.

Q. PLEASE SUMMARIZE YOUR RECOMMENDATIONS WITH REGARD TO SENSITIVITY TO FUEL PRICE FORECASTS AND ENVIRONMENTAL REGULATIONS.

A. I recommend the Company include in its IRP, pursuant to the IRP statute requirements, an evaluation of low, medium, and high fuel prices and environmental

[1] ORS AIR 1-1d.

regulations in order to evaluate its DEC Power Purchase Agreement ("PPA") costs, and for other purposes including the evaluation of resource alternatives.

One method to incorporate these sensitivities would be to use publicly available data such as Henry Hub natural gas forecasts that are available in the most recent Energy Information Administration's ("EIA") Annual Energy Outlook ("AEO") to develop low, medium, and high natural gas price forecasts. EIA provides forecasts of natural gas prices under various assumptions including "reference", "high oil and gas supply", and "low oil and gas supply" cases.[2] The Company could take a similar approach to obtain publicly available data to evaluate environmental regulations, which largely relate to CO2 regulations. Many utilities use a forecasted carbon dioxide ("CO2") tax price as a proxy for potential future CO2 regulations. The Company could derive assumptions from publicly available data from another utility, such as from Duke Energy, or the Tennessee Valley Authority, which information is included in their IRP Reports. The Company could then develop assumptions on how these fuel and CO2 forecasts would affect the DEC PPA prices. As mentioned above, the Company may already have an approach for forecasting its DEC PPA costs that it has used for other purposes, such as for financial forecasting and for making decisions about resources to acquire.

Q. PLEASE SUMMARIZE THE CONCLUSIONS OF YOUR ANALYSIS WITH REGARD TO EXISTING SYSTEM RESOURCES AND RESOURCE PLANNING.

[2] Annual Energy Outlook 2020, Natural Gas: Henry Hub Spot Price, https://www.eia.gov/outlooks/aeo/data/browser/#/?id=13-AEO2020&region=0-0&cases=ref2020~highogs~lowogs&start=2018&end=2050&f=A&linechart=~~~~~~~~~~ref2020-d112119a.60-13-AEO2020~highogs-d112619a.60-13-AEO2020~lowogs-d112619a.60-13-AEO2020&map=&ctype=linechart&sourcekey=0

A. The Company has presented information about its existing fleet of resources as required by the statute, but it did not conduct any resource planning evaluations to consider future resource alternatives. Thus, the Company has not complied with Sections 40(B)(1)(g) and 40(B)(1)(h) of the IRP statute, which require a utility to provide cost estimates of proposed resource portfolios, and to provide cost impacts of the options available to meet the utility's resource needs.

Q. PLEASE SUMMARIZE THE RECOMMENDATIONS OF YOUR ANALYSIS WITH REGARD TO EXISTING SYSTEM RESOURCES AND RESOURCE PLANNING.

A. I recommend that the Company should conduct resource planning economic evaluations as part of its IRP to compare its proposed plan to other reasonable options under different load, fuel, and risk sensitivities. For example, the DEC PPA will expire in 2028, which is within the planning horizon of the IRP, and the Company should begin to consider whether to extend that contract or whether there are reasonable full requirements supply alternatives. As mentioned above, the Company may already have an approach for forecasting its DEC PPA costs that it has used in the past for other purposes, such as for financial forecasting and for making decisions about resources to acquire.

Alternative resource plans could include some amounts of solar renewable resources, energy storage and energy efficiency programs that the Company could potentially acquire. These types of resource planning studies are typically considered in the context of an IRP, and it is incumbent on a utility to consider these options in order to identify the least cost, most reliable resource plan for its customers.

Q. WILL YOU UPDATE YOUR DIRECT TESTIMONY BASED ON INFORMATION THAT BECOMES AVAILABLE?

A. Yes. ORS fully reserves the right to revise its recommendations via supplemental testimony should new information not previously provided by the Company, or other sources, becomes available.

Q. DOES THIS CONCLUDE YOUR DIRECT TESTIMONY?

A. Yes.

RESUME OF SAMUEL WYROBECK, CONSULTANT

EDUCATION

University of South Florida

Tampa, FL

B.A. Applied Mathematics, 2018

Relevant Coursework: Optimization, Numerical Analysis, Probability, Statistics, Linear Algebra, Combinatorics, Discrete Mathematics, Java Programming

Florida State University

Tallahassee, FL

B.S. Biochemistry, 2012

EXPERIENCE

Mr. Wyrobeck is a recent college graduate with a mathematics and analytics background. He has been working at J. Kennedy and Associates, Inc. (Kennedy and Associates) in the areas of production cost modeling, resource optimization, and data analysis of electric utility companies. Since joining Kennedy and Associates, Mr. Wyrobeck has worked on projects for regulatory commissions and government agencies such as the Georgia Public Service Commission, the Louisiana Public Service Commission, and the Utah Office of Consumer Services, as well as for consumer representatives including Xcel Large Industrials.

2019 to Present: **J. Kennedy and Associates, Inc.**
Consultant

Responsible for conducting research, performing data analysis, developing production-cost model input assumptions and running production-cost studies, analyzing model output, and conducting related economic analyses.

Project Experience:

Integrated Resource Planning and Retirement Study evaluations

- Georgia Power 2019 IRP
- Kentucky Power 2020 IRP
- Xcel Energy 2020 IRP
- Dominion Energy South Carolina 2020 IRP

Energy Efficiency Rulemaking and program audits

- Assisted with the development of an Energy Efficiency impact projection model

- Assisted with development of Phase II Rulemaking
- Assisted with Plan Year 3 and Plan Year 4 audits

Economic evaluation as part of nuclear construction monitoring proceedings

Renewable energy studies, including tariff design

RFPs for 1803, Georgia Power, PacifiCorp, and Entergy

PacifiCorp General Rate Case, Energy Balancing Account, and Export Credit Proceeding

Production cost modeling and economic analysis using STRATEGIST, GRID, and Cumulus

Analysis and development of commodity forecasts and variance analyses for Georgia Power Fuel Cost Recovery Proceeding

OTHER WORK

2018 SOFWERX
Senior Intern
Organized a team of interns to build a machine learning program in TensorFlow to detect vehicles on a drone's computer, and ultimately minimize the number of pixels taken to identify the object. Developed milestones and key performance indicators for each subsection of the project. Worked to implement TensorFlow programming onto the drone's internal CPU.

2018 Primerica
Actuarial Intern
Rotated through various positions to gain exposure to the actuary career field and industry. Reported on yearly and monthly policy persistence factors and tested inputs on premium recalculation reports. Streamlined a quality assurance process by automating the verification of hundreds of pending files. Conducted quality checks on rates for several reinsurance treaties.

2017 - 2018 Huntington Learning Center, Mathnasium
Mathematics Tutor
Group tutored students from elementary to high school in areas including algebra, calculus, and trigonometry. One-on-one tutoring in differential equations and standardized testing preparation.

2014 - 2017 Aventura Hospital and Medical Center, Bayfront Medical Center
Pharmacy Technician, Assistant Buyer
Oversaw pharmacy logistics for emergency and inpatient medication. Assisted the buyer with inventory management. Managed, compounded, and distributed medicine throughout all facilities. Assisted in leadership decisions regarding medication management and staffing. Created the ER Pharmacy Technician position, specializing in monitoring inpatient medicine needs.

RESUME OF SAMUEL WYROBECK, CONSULTANT

ACADEMIC WORK

Society of Aeronautics and Rocketry, USF

Research Assistant with Dr. Wei Yang Computational Biophysics Lab, FSU

Research Assistant with Dr. Lei Zhu Organic Chemistry Lab, FSU